preceding twenty-four hours, tests were negative. In one case only were positive results obtained before the bleeding became manifest. Furthermore, the occurrence of occult hemorrhage seems to be of little prognostic significance.

## GASTROENTERIC AUTOINTOXICATION; ITS RECOGNITION AND SIGNIFICANCE AND ITS RELATION TO ARTERIAL HYPERTENSION.*

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(Continued from April Journal, p. 133.)

(Note.—The first portion of this paper appeared in the April issue of the Journal and the remainder was to have appeared in the May issue. It is needless to state that the type was destroyed. The author has been good enough to furnish us with a copy of the balance of his article, and we take pleasure in presenting it to our readers.—Ed.)

Difference in method, in size of the artery, thickness and resistance of the coats, and in the thickness of overlying tissues, form not inconsiderable and more or less inevitable elements of error. In the vast majority of cases, however, the findings of the educated finger, interpreted by the educated judgment, are of real value either in and of themselves, or as indicating the necessity for instrumental measurement. Instruments for measuring blood-pressure are of numerous forms and difficult classification. Janeway divides them somewhat as follows:

(1) Those which apply pressure to the artery by means of a solid block, and register a pulse tracing. Marey's sphymograph is the best known of these instruments. They are difficult of application; their findings depend largely on the personal equation, and therefore they do not lend themselves to accurate scientific comparison. Consequently, they are of purely historic interest.

(2) Those which apply pressure directly to the artery through a fluid or gaseous medium, and indicate blood-pressure by either spring or mercurial manometer. Of these the sphygmomanometer of von Basch was the first to meet with successful clinical use. The findings of these instruments depend largely on individual factors both objective and subjective quite independent of the actual blood-pressure, and are therefore variable and unsatisfactory. In consequence, these instruments have been all but superseded by others of the class next to be mentioned.

(3) Those which make pressure on the artery by circular cushion of compressed air, and for their criteria depend on the distal arterial pulse. The first of these was the Riva-Rocci, followed by numerous modifications, which, on the whole, have greatly increased its accuracy and convenience. Of this form of sphygmomanometer and its modifications I have used the Riva-Rocci, the Stanton and the portable Janeway. Both the Stanton and the janeway may be used to determine diastolic as well as systolic pressures. They are both excellent instruments, the portable Janeway, perhaps, being somewhat more convenient for the combined work of house and office.

(4) Those which make pressure on the artery by circular cushion of compressed air, and depend for their criterion on the distal capillary circulation. Of these, the Gaertner Tonometer is the best known. Martin has improved this instrument by substituting a finger-band of the Riva-Rocci type for the Gaertner ring. Instruments of this type measure systolic pressure only.

(5) Those which make pressure on the artery by circular cushion of compressed air, depend for their criterion on the return of the distal pulse, indicate the arterial tension by a mercurial manometer, and graphically record its variations. Of these instruments, Erlanger's is one of the best. While admirable for scientific work, it is too complicated and cumbersome for routine work in general practice.

In an early period, we may cure at least a majority of these cases; later, we may generally arrest or greatly delay their progress; but in their terminal stage, we are little more than sympathetic spectators of a tragedy long since inevitable. The early recognition, and the prompt and intelligent treatment of gastroenteric autointoxication and the degenerative processes which follow in its course, are therefore among the most important duties of our profession. Our text-books in dealing with the therapeutic aspect of these questions are most perfunctory, and our periodical literature is fragmentary and inadequate.

In my opinion, iodides and nitrites are not by any means our only resource, or even our main reliance, in any but the terminal stage of these troubles—when their effect is purely palliative. I have therefore attempted to envisage this subject from another than its somewhat stereotyped aspect, in order to suggest a more rational and effective prophylaxis and therapy.

To Federn, I believe, is due the signal credit of being a pioneer long in advance of the main body of his confreres in the recognition of the essential nature of these troubles, of their pathogenesis, and their effective treatment. But his voice, like that of many a pioneer, as he himself laments, has been a crying in the wilderness. Federn did not recognize, perhaps, nor in this paper do I presume to present, the complete pathogenetic chain; but unless I am greatly in error, his has been the enviable fortune to discover important diagnostic criteria, and to suggest measures indispensable to successful treatment.

Convinced as I am, that arteriosclerosis and arterial hypertension in a very large, if not the greater number of cases, owe their origin and progress to perversions of the digestive functions; in other words, are but a secondary stage of gastroenteric autointoxication, I not unnaturally consider these conditions together, and regard a painstaking and intelligent supervision of the digestive tract and its tributary organs as absolutely indispensable in their prevention and treatment. Syphilis, lead, alcohol, and various acute infections, are unquestionably potent factors in the development of arteriosclerosis.

* Read before the Yolo Society for Medical Improvement, November 7, 1905.

I ignore these, however, not only for want of time for their consideration, but also, and more particularly, because I desire to focus attention on more important etiologic factors.

Great judgment is necessary in the regulation of the activities of the patient. Excitement, fear, anger, pain, all forms of active mental labor and physical exertion, particularly if attended by mental effort, markedly increase arterial tension. Emotional disturbances, therefore, and mental or physical strain, should be sedulously avoided.

In advanced or extreme cases, running on a slender margin of cardiac reserve, or approaching the danger point of intracranial tension, both mental and physical rest must be enforced. But mental occupation and physical exercise are physiological necessities, and in the milder cases should be regulated, not unreasonably curtailed. Equanimity, so likely to be seriously disturbed in these cases, should be systematically fostered; although, especially in the early and amenable stages, the patient should be sufficiently impressed with the importance of the condition to secure implicit obedience to a necessary but irksome regimen. Whether from the digestive or the circulatory aspect, it is difficult to exaggerate the value of moral influence. The principles enunciated by Dr. Dubois in his classic and invaluable work, "Les Psychoneuroses et leur Traitement Moral," are of much wider application than is implied by the title; but their elucidation here would lead us too far.

Rest and change, relief from harassing responsibilities and from friction of all sorts, assist in restoring the nervous system, and thus indirectly, but powerfully, promote the digestive functions. Recreation and diversion are of inestimable value. Recreations innumerable crowd upon the mind—walking, riding, rowing, fishing, hunting, mountain-climbing, hand-ball, golf, tennis, billiards, nature-study in various forms. Music is one of the best of recreations. In the embarrassment of riches in mechanical players — cecilian, angelus, pianola, eolian, orchestrelle and what not—every taste may be gratified and every whim indulged. By emancipating from years of drudgery, and keeping on tap, as it were, the greatest variety of musical masterpieces, they are destined to play a great part in the hygiene of the nervous system. From a somewhat extended personal knowledge, I find it difficult to praise them too highly. And then literature and art and poetry, noblest of them all! Let Wordsworth lead us back to nature!

In the treatment of gastroenteric autointoxication, whether or not associated with its later phenomena, the causal indications must be kept constantly in the foreground. These may be summarized in one sentence: *Check the abnormal gastroenteric decomposition.* To meet these indications, catarrh of the nose, throat and bronchi should be cured, carious teeth should be either filled or removed, and the mouth should be kept in a clean and healthful condition. The diet in quantity and quality should be adjusted to the requirements of the system and to the capacity of the digestive organs; while ample for all of the needs of the ecomomy, it must not be excessive, particularly in nucleins and albumenoids, which, by their putrefaction, are the chief if not the sole agents in the morbid conditions under discussion.

The experiments of Chittenden and Folin conclusively demonstrate that the quantity of protein necessary to maintain nitrogenous equilibrium is less than half that estimated by Voit and practically adopted in the American standard of living. A material reduction of protein should therefore usually be advised. A moderate lactofarinaceous diet may easily carry the fifty or sixty grams of protein considered necessary by Chittenden.

We Americans eat—no, we do not eat, we *bolt*—too much food, too rich food, foods unfit by nature and damned by the cook. We are culinary barbarians. Foods, then, should frequently be reduced in quantity, but never below a moving equilibrium of the economy; and they should generally be more scientifically prepared and more esthetically served. Appetite, as Pawlow has demonstrated, is the most powerful adjunct of good digestion. The "appetite juice," as he graphically calls it—the flow of digestive juices excited through the optic, olfactory and gustatory nerves by desire and relish—is abundant and prolonged. It should be stimulated by appeal to the special senses—to memory even, and the association of ideas. The table should be a place of relaxation, leisure and delight.

In the regulation of diet, fresh meats, eggs and fish should first be limited; and legumes, salt and preserved meats and fish—"canned goods," as they are euphemistically called—should be prohibited. If intestinal putrefaction still continues, a lacto-vegetarian, and later if necessary, a strictly vegetarian diet should be adopted. Haig, who is an especial advocate of the vegetarian diet, says it will reduce excessive tension to normal in a short time. While my own results have been favorable, they have not been so prompt and radical as Haig's reports led me to hope.

Changes in diet should generally be gradual and conservative, in order both to educate the tastes of the patient, and to develop latent digestive and assimilative powers. Sudden and radical changes often begin to disgust and end in failure. The dietary, whether mixed, lacto-vegetarian or purely vegetarian, should contain a moderate quantity of fruit and a large quantity of bran. If the views of Federn are correct, bran should serve two important purposes in these cases; as a laxative, and in preventing adhesion of the fecal mass to the bowel mucosa. As a matter of fact, following the practice of Dr. Simmons, I have for several years prescribed it in constipation with excellent results. Each patient should be provided with a diet list as varied as possible, and in as far as possible conforming to his tastes and habits.

Following the suggestions derived from Pawlow's experiments, food, as I have already pointed out, should be "appetizing"; farinaceous foods should be taken dry so as to stimulate the salivary secretions. Oils and fats, with the exception of butter, inhibit gastric secretion, and should not be taken with meals, but two or three hours after,

when they soon enter the bowel and actively promote pancreatic and intestinal secretion. Animal broths powerfully stimulate the stomach, and should precede each meal. In cases of achylia gastrica or marked hypoacidity, from 25 to 50 minims of dilute hydrochloric acid taken in from eight to twelve ounces of highly carbonated water two or three hours after each meal promote the secretions of the liver, pancreas and intestine. Vegetable acids answer a similar purpose and, when they agree, may be used instead of the mineral acids. That foods should be thoroughly masticated one would think goes without saying; and yet only a few months ago a respectable contributor to one of our leading journals gravely maintained that mastication of meats is a work of superogation. This is probably true of the anaconda. As far as man is concerned, however, a consideration of the mathematics of digestion conducts us inevitably to a different conclusion. Speaking broadly, foods are digested entirely from the surface. Therefore, *ceteris paribus,* they digest in ratio to the surface exposed. A solid one inch in diameter exposes one-tenth part of the surface that it would expose if divided into similar solids one-tenth of an inch in diameter, and other things being equal, is consequently one-tenth part as digestible. Starchy foods require thorough mastication not only to increase their surface, but also to mix them with the saliva and thus secure their digestion before they enter the stomach.

If foods are digested by the salivary and gastric secretions, absorption may go on through the entire length of the small intestine. Comparatively little proteids would thus reach the colon to putrefy and poison the venous system. Thorough mastication, moreover, means more time and attention given to the digestive processes, and, within certain limits, a corresponding stimulative and tonic influence on the digestive function.

Normally, foods should be absorbed and their undigested residue excreted within from eighteen to thirty-six hours from the time they are ingested. In conditions of fermentation and putrefaction, their passage should be more rapid. Delay means a greater production and absorption of toxic substances.

In addition to a laxative diet, laxative remedies are often indicated to sweep bacteria and their toxins out of the intestines. Purgation sometimes permanently clears the intestinal tract of noxious bacteria. Calomel, phenolphthalein, cascara, aloes, sulphur, senna are ordinarily to be preferred. Eserine and strychnia assist in toning up the weakened bowel, and should be used in conjunction with laxatives and bitter tonics as required.

In the long run, and presuming the ingestion of only the normal quantity of proteids, the prevention of an abnormal toxicity of the gastroenteric contents depends, in the main, on normal conditions of secretion, motility, absorption and drainage. But these can by no means always be promptly established, and antiseptics, therefore, may be occasionally useful if not indispensable. They may be advantageously combined with laxatives. Naphthalin, although inclined to produce tenesmus, is useful; alphozone is useful in the upper tract, and perhaps in the lower, although my personal observation does not fully convince me; oil of cloves and thymol in an olive oil emulsion with carbonated water two or three hours after meals, has often seemed to me of distinct advantage. It is an admirable stomach disinfectant. In these cases the liver is usually incompetent, and olive oil is possibly useful by the formation in the bowel of sodium oleate, which is said by some to have a distinct cholagogue effect.

Federn extols the faradic current in partial atony. He places one pole over the atonic segment, and the other over the lower sigmoid, over the anus or even within the rectum, and passes the current for fifteen or twenty minutes daily. This may be continued for several months—from three to six—before permanent results can be expected, and even then, relapses occur. I am thoroughly convinced of the great value of electricity, and employ the faradic current after the method of Federn, as well as the sinusoidal and the wave current. Formerly I employed the interrupted galvanic current, but perhaps mistakenly abandoned it on account of the greater convenience of the other currents.

Absorption should be promoted so that as little proteid as possible may pass into the colon to putrefy. Abdominal exercises, massage and vibration, a normal peristalsis and a normal blood-pressure are our chief means for this purpose. Vibration of the spinal nerves, and massage of the abdomen and exercise of the abdominal muscles, are valuable.

The fauna and flora of the human intestine are not exempt from the struggle for existence, or from the interdependencies and antagonisms which dominate the flora and fauna with which we are more familiar. Metchnikoff suggests the possibility of so modifying our intestinal flora as to make it entirely, or at least comparatively, harmless—to transform it, as it were, from a savage into a civilized flora. This seems in a measure to have been accomplished by the use of kefir and kumyss. I have used both in a large but not in a sufficient number of cases, to warrant a personal opinion. That Metchnikoff suggests it is warrant enough for its tentative acceptance.

Atony and dilatation of stomach, functional and organic stenosis of pylorus, the various forms of visceral ptosis and relaxation of the abdominal walls, should be corrected by abdominal exercise, by an efficient support, by electricity, strychnia, and if necessary by an appropriate operation. Mechanical impediments lower down, fissure, fistula and hemorrhoids should receive appropriate treatment. Tobacco, alcohol, tea, coffee, cocoa and chocolate should be interdicted. All of these things either impair digestion, stimulate the heart, or increase peripheral resistance.

Chronic infection of the intestinal mucosa is quite as inveterate as chronic mucous infections elsewhere. It sometimes persists in spite of prolonged and conscientious treatment. In selected cases of this refractory character, it is possible that appen-

dicotomy, with systematic efforts to disinfect the colon might be justifiable. It certainly is a rational procedure, and affords excellent results in chronic dysentery.

In the secondary or degenerative processes and their attendant functional disturbances, the same dietetic, hygienic and therapeutic management as in the primary stage is necessary.

Of the secondary effects, anemia should receive the same treatment as in other conditions; iron, arsenic, manganese, but in their less irritating forms. The peptonates, albuminates, etc., seem to me to be particularly adapted to these cases.

In arteriosclerosis of presumably gastroenteric origin, if the iodides are useful, they have not been brilliantly so under my observation. In deference to general opinion, however, I continue to use them. In some cases, potassium iodide may have retarded the degenerative process, and it has seemed to me distinctly useful in reducing arterial tension.

Arterial hypertension is perhaps just now our most distinguished symptom. But although a symptom, it is also a link in a chain of morbid processes which, unless arrested, lead inevitably to dissolution. Practically all of the measures already indicated are essential in the prevention and cure of arterial hypertension of gastroenteric origin. They remove the cause. In prevention and in the treatment of the early stages, they are sufficient. In addition, the skin should be kept warm so as to dilate the arterioles and capillaries of the cutaneous areas, and thus diminish the peripheral resistance, and consequently arterial tension also. The kidneys should be kept active in order to eliminate toxins and to reduce the volume of blood.

Whenever hypertension menaces either the heart, the arterioles or the circulatory balance, however, more active measures are indispensable. Here the nitrites often render marvelous service. In all my therapeutic experience, I recall nothing else even approximately so spectacular as the effects of a hypodermic of nitroglycerine in edema of the lungs due to rupture of circulatory balance.

If, notwithstanding a strict regimen, the systolic pressure exceeds 160, and particularly if, at the same time, there be evidence either of inadequacy of the heart or of degeneration of the cerebral arterioles, the nitrites should be systematically used in conjunction with potassium iodide. Sodium nitrite, in doses of one decigram or more as necessary to produce its physiological effects, is the best of the nitrites for continued use. The vasomotor centers become gradually, in some cases rapidly, accustomed to the nitrites, and may finally cease to respond to them. Besides, in large doses, sodium nitrite irritates the stomach, and in company with the other nitrites, may have other untoward by-effects. Its use, therefore, should not be begun too early, or continued too unremittingly. When rupture of the circulatory balance threatens, the patient should always have with him amyl nitrite pearls, or hypodermics of nitroglycerine, for use in attacks of cardiac asthma, edema of the lungs, and angina pectoris. I have repeatedly seen life saved and materially prolonged by this precaution.

Aconite and veratrum viride are often useful in subduing the heart's action; but they should rarely be used except in conjunction with the nitrites, and never unless there is evident cardiac reserve. With these limitations, I have found them unquestionably beneficial.

Failing compensation, with secondary low pressure, require the most careful management, even to the minutest details. In these cases a slight increase of the toxemia, by raising the blood-pressure, may exhaust the cardiac reserve. Hence, the diet and the functions of the digestive tract should receive constant and careful attention. Merck's digitalin in liberal doses—from one to three centigrams four times a day—well guarded by the nitrites and continued for a long period, is often of great service. The addition of morphine to secure rest and to stimulate the heart in extreme cases, is a great boon.

In cardiac asthma, and pulmonary edema with hypertension and cardiac reserve, hot-air baths reaching a temperature between 350 and 450 degrees Fahrenheit, I have seen produce phenomenal and permanent improvement. They produce a marked initial lowering of blood-pressure, stimulate the functions of the skin and kidneys, promote metabolism, and probably in undetermined ways promote recovery.

## PAIN. *

By E. R. WAGNER, M. D., San Jose.

Pain leads patients to seek medical relief, perhaps more than any other one symptom of disease. The more insistent and obstinate it is, the quicker is relief sought. In no other part of the body is this symptom more frequently manifested than in the head and nowhere else is the cause more apt to be obscure and the relief, consequently, more uncertain. I doubt whether pain is as hard to bear in other parts, as it is in the head; or whether it unfits a man so completely for usefulness in society.

That part of the head which is of greatest interest to the nose and ear specialist, embraces a number of nearly closed cavities, lined with a sensitive mucous membrane. When congestion, exudation or suppuration occurs, the unyielding walls afford but little room for expansion and pressure symptoms, chief among which is pain, are the result. Toothache is often patiently borne, because the consequences of neglect are not usually considered serious. When, however, one learns from statistics that 70 per cent of cases of empyema of the maxillary autrum are due to disease of the teeth, the subject assumes a different aspect. Earache, especially in children used to be treated carelessly, or not at all, but of late years the direful consequences of neglect are becoming more widely known, and pain in the ear of even short duration is cause for anxiety, and doubly so if it occurs in the course of the exanthemata, influenza or diphtheria.

A correct diagnosis of the cause of pain in the ear is essential to effective treatment, and in the

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